

1. A method for analyzing nerve cell damage in a human subject comprising the steps of:

(a) providing a biological sample isolated from a human subject suspected of having a damaged nerve cell, the biological sample being a fluid in communication with the nervous system of the subject prior to being isolated from the subject;

(b) detecting in the sample the presence or amount of at least one marker selected from α II spectrin and an α II spectrin breakdown product (SBDP) generated from proteolytic cleavage of α II spectrin by at least one protease selected from the group consisting of caspase-3 and calpain; and

(c) correlating the presence or amount of the marker with the presence or type of nerve cell damage in the subject.

2. The method of claim 1, wherein the biological sample comprises cerebrospinal fluid.

3. The method of claim 1, wherein the subject has sustained trauma.

4. The method of claim 1, wherein the marker is α II spectrin.

20 5. The method of claim 1, wherein the marker is SBDP150i.

6. The method of claim 1, wherein the marker is SBDP150.

25 7. The method of claim 1, wherein the marker is SBDP145.

8. The method of claim 1, wherein the marker is SBDP120.

9. The method of claim 1, wherein the step (b) comprises detecting in the sample the presence or amount of at least two markers selected from α II spectrin, SBDP150i, SBDP150, SBDP145, and SBDP120.

10. The method of claim 1, wherein the step (b) comprises detecting in the sample the presence or amount of at least three markers selected from α II spectrin, SBDP150i, SBDP150, SBDP145, and SBDP120.

5 11. The method of claim 1, wherein the step (b) comprises detecting in the sample the presence or amount of at least four markers selected from α II spectrin, SBDP150i, SBDP150, SBDP145, and SBDP120.

10 12. The method of claim 1, wherein the step (b) comprises detecting in the sample the presence or amount of α II spectrin, SBDP150i, SBDP150, SBDP145, and SBDP120.

15 13. The method of claim 1, wherein the step (b) comprises contacting the sample or a portion of the sample with an agent that specifically binds the marker.

14. The method of claim 13, wherein the agent does not specifically bind at least one of α II spectrin, SBDP150i, SBDP150, SBDP145, and SBDP120.

15 15. The method of claim 14, wherein the agent specifically binds only one 20 of the group consisting of α II spectrin, SBDP150i, SBDP150, SBDP145, and SBDP120.

16. The method of claim 13, wherein the agent is an antibody.

25 17. The method of claim 1, wherein the step (b) comprises immobilizing the biological sample or a portion of the sample on a substrate.

18. The method of claim 17, wherein the step (b) further comprises contacting the substrate with an agent that specifically binds the marker.

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19. The method of claim 1, wherein the step (c) of correlating the presence or amount of the marker with the presence or type of cell damage in the subject comprises comparing the presence or amount of the marker in the sample with that in a standard sample known to not contain the marker.

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20. The method of claim 1, wherein the step (c) of correlating the presence or amount of the marker with the presence or type of cell damage in the subject comprises comparing the presence or amount of the marker in the sample with that in a standard sample known to contain a known amount of the marker.

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21. A mixture comprising:

(a) a biological sample isolated from a human subject suspected of having a damaged nerve cell, the biological sample being a fluid in communication with the nervous system of the subject prior to being isolated from the subject; and

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(b) an agent that specifically binds at least one marker selected from α II spectrin and an α II spectrin breakdown product (SBDP) generated from proteolytic cleavage of α II spectrin by at least one protease selected from the group consisting of caspase-3 and calpain.

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22. The mixture of claim 21, wherein the marker is selected from the group consisting of α II spectrin, SBDP150i, SBDP150, SBDP145, and SBDP120

23. The mixture of claim 22, wherein the agent does not specifically bind at least one of α II spectrin, SBDP150i, SBDP150, SBDP145, and SBDP120.

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24. The mixture of claim 23, wherein the agent specifically binds only one of the group consisting of α II spectrin, SBDP150i, SBDP150, SBDP145, and SBDP120.

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25. The mixture of claim 21, wherein the agent is an antibody.

26. The mixture of claim 21, wherein the mixture is immobilized on a substrate.

27. The mixture of claim 21, further comprising a detectable label.

28. The mixture of claim 27, wherein the detectable label is conjugated to
5 the agent.

29. The mixture of claim 28, wherein the detectable label is conjugated to
a substance that specifically binds to the agent.

10 30. A kit for analyzing cell damage in a subject, the kit comprising:

(a) a substrate for holding a biological sample isolated from a human subject suspected of having a damaged nerve cell, the biological sample being a fluid in communication with the nervous system of the subject prior to being isolated from the subject;

15 (b) an agent that specifically binds at least one marker selected from α II spectrin and an α II spectrin breakdown product (SBDP) generated from proteolytic cleavage of α II spectrin by at least one protease selected from the group consisting of caspase-3 and calpain; and

20 (c) printed instructions for reacting the agent with the biological sample or a portion of the biological sample to detect the presence or amount of the at least one marker in the biological sample.

31. The kit of claim 30, wherein the marker is selected from the group consisting of α II spectrin, SBDP150i, SBDP150, SBDP145, and SBDP120

25 32. The kit of claim 31, wherein the agent does not specifically bind at least one of α II spectrin, SBDP150i, SBDP150, SBDP145, and SBDP120.

30 33. The kit of claim 32, wherein the agent specifically binds only one of the group consisting of α II spectrin, SBDP150i, SBDP150, SBDP145, and SBDP120.

34. The kit of claim 30, wherein the agent is an antibody.

35. The kit of claim 30, further comprising a detectable label.

36. The kit of claim 35, wherein the detectable label is conjugated to the
5 agent.

37. The kit of claim 36, wherein the detectable label is conjugated to a substance that specifically binds to the agent.

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